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QUARTERLY

Subscription: $2.00 per annum

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EDITORIAL

One of the most important items of business transacted at the Quebec Convention of the Canadian Medical Association, June 11th to 15th, 1956, to radiologists, was the amendment to Section 26 of the report of the Executive Committee dealing with Health Insurance. The following are extracts from this report:

HEALTH INSURANCE

24. The culmination of a series of Federal-Provincial conferences occurred in late January 1956, when the Government of Canada offered to the provinces a formula for financial assistance to aid the introduction of a plan of hospital care insurance. The offer was dependent on "a majority of the provincial governments representing a majority of the people of Canada" agreeing to participate. The basic stipulations were that the plan should make available standard ward care in active treatment hospitals, and presumably in hospitals for the care of the chronically ill, for all residents of the province. The benefits were to include specified diagnostic radiological and laboratory services, initially to patients in hospitals and subsequently to persons outside of hospitals and the element of co-insurance or other deterrent payment was not to be excessive.

25. It is evident that this proposal is of great importance to the medical profession and it is also evident that the important decisions by which the offer will become effective will be made at the level of the provincial governments. Divisional committees therefore, with varying degrees of intimacy have been dealing with their respective provincial governments to bring to the problem the viewpoint of the profession. The Association's Advisory Committee to the Department of National Health and Welfare met with the Minister of National Health and his Departmental officials on March 15th to discuss the implications of the Federal offer and on this occasion the Committee was happy to have associated with it representatives of l'Association des Médecins de Langue Française du Canada, the Canadian Association of Radiologists and the Canadian Association of Pathologists. The Minister required an understanding that the discussion should remain confidential but it is no violation of this to indicate that the areas of debate have all been explored in the public press.

26. Subsequent discussion of the issues by Divisional Committees and by the Committee on Economics suggests that medical opinion generally is favourable to the institution of universal hospital care insurance, qualified by certain apprehensions respecting the economic and professional consequence of such a step. The introduction of a service in radiological and laboratory medicine is regarded as a much more difficult and complex procedure and no clear pattern is discernible for the provision of an out-of-hospital service in these important fields of medicine.

The Canadian Medical Association affirms that diagnostic radiological and clinical pathological services are medical services and not hospital care, and should be so treated in any insurance plans.

27. At the time of writing the Governments of British Columbia and Saskatchewan would seem to have indicated their willingness to participate in the Federal proposal. This early acquiescence was to be expected because the Federal offer provides substantial aid to a program in hospital care insurance which is already in effect in these provinces. Active consideration is proceeding in the remaining provinces but few if any firm conclusions appear to have been reached. It is significant and encouraging that in two provinces legislation providing for the administration of the hospital insurance program by a Commission is being enacted. This is essentially consonant with the "independent non-political commission" form of administration which has long been a feature of C.M.A. policy.

It should be remembered that for some time there has been a controvery concerning the practice of certain specialties in hospitals, and it is thought that the new policy of the Canadian Medical Association will draw the line clearly between medical services and hospital services and by so doing will contribute considerably to the clarification of the relationship between hospital and radiologist.

A service rendered by a physician under a physician-hospital contract must be shown as a service of the physician to the patient rather than a service provided by the hospital.

The Canadian Medical Association is to be highly commended for this long-awaited amendment.

Guillaume Gill, M.D.

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Volume VII June 1956 Number 2

FRACTURES AND PSEUDARTHROSES OF THE FIRST RIB*

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Defects in the continuity of the first rib are easily missed on radiographs because the rib is partially concealed by the clavicle on routine PA projections and by the shoulder girdles on lateral projections. Such defects are, however, not as uncommon as is usually thought.

Case Reports

Case 1: a healthy male age 30. A routine PA film of the chest was done in January 1954, shortly after his being employed in the Alexandra Hospital for Infectious Disease. It showed (Figure 1) a break in the continuity of the first rib just anterior to its mid-point. The appearance of the defect, with smooth edges, slight flaring of the margins, slight sclerosis of the edge, and a radiolucent line two or three mms. in width traversing the rib, was typical of an un-united fracture. It is also typical of so-called "Congenital Pseudarthrosis". The patient was carefully questioned. There has been no injury of the shoulder at any time, and no signs or symptoms related to the right upper thorax or right side of the neck could be elicited.

Figure 1. — (Case 1) Defect discovered on routine film of asymptomatic individual with no history of trauma.

It was then found on further questioning that he had been admitted for an unrelated illness to the Queen Mary Veterans' Hospital of Montreal in November 1952, about 15 months before this film. The films of the chest made during that admission were obtained and showed the defect, the appearance of which was identical with that on the present film.

Through the co-operation of the X-Ray Department of the Queen Mary Veterans' Hospital, the man's enlistment film, dated November 1942, was obtained. This showed (Figure 2) that the first rib was intact.

This man is an ambulance driver and therefore must carry heavy loads on stretchers. Most of his patients are children, but some are adults.

Figure 2. — (Case 1) Film made 12 years previously shows intact rib.

Case 2: a 25 year-old healthy male. A routine chest film showed (Figure 3) a typical defect (the so-called "Congenital Pseudarthrosis") in the middle of the right first rib. Careful inquiry revealed no history of direct or indirect violence to the area or symptoms of any kind in the right side of the neck or right upper thorax. He is a plumber. His work involves carrying pipes and heavy wrenches. The pipes are sometimes carried on his shoulder.

*Presented at Annual Meeting, The Canadian Association of Radiologists, January 11, 1955, Ottawa.

Films of the same man made five years previously in 1949 (Figure 4) show that at that time the defect was unquestionably bilateral.

Case 3: A healthy 9 year-old boy was in an automobile accident and suffered severe chest trauma. Films of the thorax made within about two hours of the accident showed a typical acute traumatic fracture involving the first right rib (Figure 5). The fracture edges were well defined, and there was a pleural reaction immediately deep to the fracture site (an azygos lobe was also present as an incidental finding). It was felt that the appearance of the fracture fragments was typical of an acute traumatic lesion and this was confirmed by the contiguous pleural reaction. In addition, it was possible to obtain a film made approximately three and a half years before the accident (November, 1948).

This showed that the first right rib was unquestionably intact (Figure 6). The pleural reaction present immediately after the accident was not present in 1948. Follow-up films during the days and weeks immediately following the injury showed that the pleural reaction deep to the fracture site subsided within approximately ten days. The fracture itself, however, *failed to unite by bone.* Follow-up films made up to two and a half years after the injury showed the defect in the rib to be persistent (Figure 7). The child had made a complete recovery in the weeks following the injury and, at the time of the follow-up examinations had no signs or symptoms related to the upper thorax or neck.

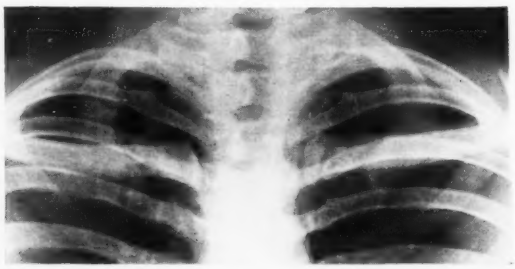

Figure 3. — (Case 2) Routine chest film in healthy male age 25 showed unilateral first rib defect.

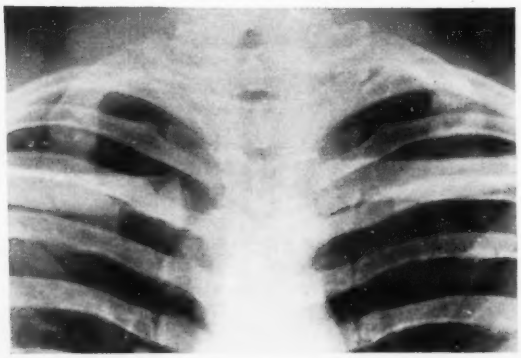

Figure 4. — (Case 2) Film made 4 years previously shows bilateral first rib defect.

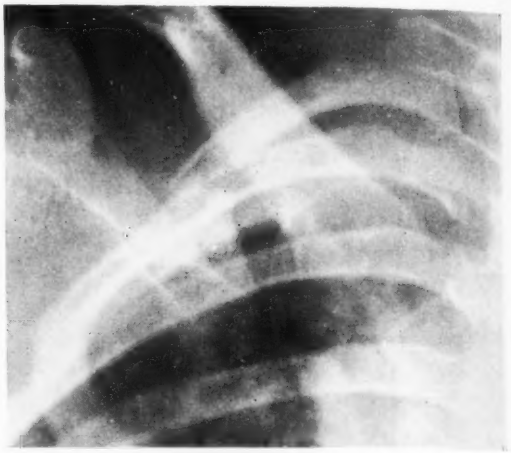

Figure 5. — (Case 3) Film within 2 hours of chest trauma shows acute fracture of right rib with underlying pleural reaction. Male age 9.

Figure 6. — (Case 3) Film made 3 years previously at age 6. First rib intact. No pleural reaction.

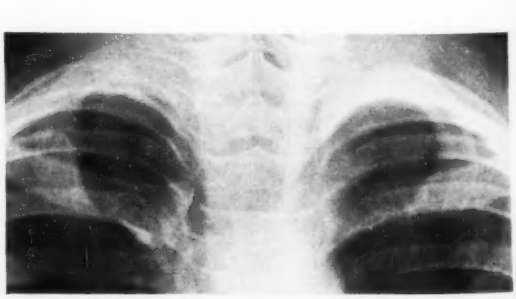

Figure 7. — (Case 3) Follow-up film 2½ years after trauma shows failure of fracture to unite by bone. Pleural reaction has disappeared.

Comment

The literature on the interpretation of defects in the continuity of the first rib has previously been somewhat contradictory. Some authors have stated that it represents a "Congenital Pseudarthrosis" of the rib. Others have said that it represents a fracture with non-union.

In 1869, the first case of traumatic fracture of the first rib was reported by Jones[14]. A male, age 50 years, was in a fight, and fell, striking the side of his neck on a curbstone. After he fell, he was kicked several times around the shoulder and side of the neck. Death occurred in a few minutes. At autopsy the first rib was fractured close to the spine with a two-inch piece of rib detached and lying below the clavicle imbedded in a lung apex. This fragment had torn through the subclavian artery.

In 1887, Arbutnot Lane,[15,16] a surgeon and anatomist of strong opinions, stated that although fracture of the first rib was said to be "the rarest of all fractures" the reverse was the case and that it was actually more common than fracture of the centre of the clavicle. He had found four undoubted examples in two hundred dissecting room subjects, not including other doubtful cases, and not including cartilage or cartilage-bone junction fractures. One case he reported in particular where fracture of the rib had occurred "with firm union by ligamentous tissue". There was an associated un-united fracture of the acromion on the same side. His examination did not include microscopic sections, which have never been done in any reported case in the literature to date. While exaggerating the frequency of first rib fractures, Lane's report drew attention to the fact that they are not rare.

Since then, several authors have claimed to have observed acute traumatic fractures of the first rib followed by non-union.[6,13,18] These reports included those suffered by direct and indirect violence. I can find, however, no previous report of a case where the first rib has been demonstrated to be intact before an injury, and un-united following the injury, as is shown in Case 3, above. It has therefore not been possible previously to be certain that acute traumatic fractures on the first rib could result in non-union.

Other observers have felt that these defects in the first ribs, found in asymptomatic individuals, must have been caused by multiple minor traumata resulting in "fatigue fractures".[2] Cases have been reported where the lesion was shown in persons whose occupation involved heavy lifting or carrying heavy weights on their head or shoulders.[1] One author, for example, showed it in three soldiers who had been carrying barracks bags on their shoulders, and he called this a "barracks bag fracture". There have been cases described in which acute pain in the neck and shoulder occurred during heavy lifting (but without actual direct trauma), and in which the lesion was demonstrated immediately or some time shortly after the acute pain. None of these cases have adequate follow-up by clinical or radiological examination. There is, however, one report of one patient[2] who was shown to have had an intact first rib and in which a defect later appeared without a history of trauma and without signs or symptoms. Case 1, of the present communication, is the second of such cases to be reported.

It has frequently been suggested that these rib defects are "Congenital Pseudarthroses".[4,9,13] In support of this concept, the absence of trauma and the absence of signs and symptoms are the only evidence cited. That this reasoning is incorrect is shown by the failure to demonstrate the lesion at any time in the fetus or in the newborn infant. The lesion, in fact, has a rather typical age distribution which would seem to establish it as an acquired lesion. The largest published series of cases was contributed by Alderson,[2] who reported 73 first rib defects and showed that it occurs most frequently in the age group from nineteen to twenty-five, when it reaches an incidence of approximately 1 in a 1000 routine chests. The incidence diminishes in younger and older age groups. All other recorded observations have tended to confirm this age distribution, though other statistics are not as complete as Alderson's. It is worth noting that a very large number of chest X-rays are seen in the X-ray departments of pediatric hospitals; the first rib is slightly better visualized in routine frontal projections of the chest in infants and children than in adults. It therefore appears reasonable to suggest that we are not missing the defect in infancy and childhood.

Case 1 demonstrates that the lesion can appear without known injury and without signs or symptoms in a healthy young adult male. Case 2 shows that the defect, appearing without known trauma in a healthy individual, can heal after it is clearly demonstrable by X-rays. Case 3 demonstrates that when produced by acute trauma, a fracture of the middle of the first rib may fail to unite by bone.

The location of the defect, approximately in the middle of the first rib in the region of the groove for the subclavian artery, just at or behind the scalene tubercle of Lisfranc where the serratus anterior muscle attaches,

is remarkably constant. Fractures posterior or anterior to this location, studied by us, but not reported in detail here, unite by bone uneventfully. The reason for this constant location is not clear. One may only suspect that this is an area which is peculiarly subject to stress, or where, following trauma, the normal process of bone formation is deficient.

Lane, in his original studies, stated that there are three possible mechanisms for first rib fractures.

1. Direct trauma through the back.
2. Indirect trauma through the clavicle, the shoulder being depressed forcibly, and the clavicle acting as a lever pressing on the first rib.
3. Indirect trauma; the force acting through the sternum.

That indirect trauma alone can be the cause was proven conclusively in 1944, by Gutmann.[12] He reported six sailors who were caught in an explosion in a confined space in a ship, all suffering blast injuries. Most of them had perforated eardrums. Three of them had hemoptysis. The other three had mild chest pain. All six had fractures of the first rib, five unilateral and one bilateral. This experience had the perfection of the controlled laboratory experiment.

Conclusions

Fractures of the first rib are much commoner than generally realized and are frequently overlooked. They may be produced by a direct or indirect violence. When occurring in the middle third of the rib, they may go on to non-union. An un-united fracture may be found in a person without any history of acute or violent direct or indirect injury, and in a rib which has previously been shown to be intact. It seems likely that in such cases the defect is a "fatigue fracture" due to multiple minor traumata or stresses. Such defects may unite by bone over a period of several years. The asymptomatic defects are commonest in the age group 19 to 25 years, and the above findings partially explain this peculiar age distribution. While congenital anomalies of the first and second rib are common, there is no evidence to suggest that a congenital pseudarthrosis is ever the cause of the defects which are the subject of the present study.

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THE REGULATION OF SHOE FITTING FLUOROSCOPES*

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Introduction

Shoe fitting fluoroscopes have recently been receiving a good deal of attention. Articles about them have appeared in technical journals and popular magazines. A number of states and cities in the United States have adopted means of regulating their use, and one Canadian province has issued recommendations for their safe use.

This review of regulations and recommendations has been prepared in response to a number of requests for information about these devices.

The Problem

Most authorities believe that exposure to ionizing radiation should be reduced to the lowest possible level. They feel that all unnecessary exposure should be eliminated, and that necessary exposures should be kept to the minimum. They point out that in most cases modifications can be made so that the desired result can still be obtained with smaller outputs of radiation, resulting in smaller doses to the individual.

The purpose of this paper is

(1) to show the nature of the hazards which may be associated with shoe-fitting fluoroscopes, and

(2) to discuss the various means by which they can be made to operate under conditions that are considered safe for necessary exposure.

How the Problem was Approached

In 1946 the Department of Health of New York decided to obtain some facts about the conditions under which these machines were operated. A survey was made, and it indicated that there was a considerable hazard, both to shoe store employees and to customers having their feet X-rayed. In only a few cases were the people in charge of the equipment at all aware of the potential danger of repeated exposure to excessive radiation.

As a result of this survey, regulations for the safe use of the machines were adopted. Other cities and states have subsequently confirmed the potential hazard from the use of shoe fitting fluoroscopes, and some of them have taken steps to remedy this hazard.

The reasoning for the regulations and the way in which they have been enforced will now be described.

The Nature of the Hazards

The hazards can be divided into two types:

A. Those which primarily affect the customer.

B. Those which primarily affect the sales staff.

A. The Hazard to the Customer:

Here we are concerned with the effects of a direct beam of radiation on a localized part of the body, in this case the feet and legs.

The International Commission on Radiological Protection recommended in 1950† that the exposure to a localized area of the body should not exceed 1500 milliroentgens per week. This is equivalent to a total of 78 roentgens in a year. But the Commission made it very clear that this figure is to be considered as a maximum, and that exposure should be maintained at a much lower level. It should be emphasized that the dose of 78 roentgens refers only to exposure of the feet, and not to whole body exposure.

The early surveys of shoe fitting fluoroscopes showed outputs averaging from 30 to 40 roentgens per minute to the feet. It is obvious that at this rate a customer's feet could receive a year's maximum dose in two or three minutes of exposure. Many of the customers were having examinations of greater length than this.

When it was found that the output of the machines was so high, the next question was to find out if the dose to the feet could be reduced, without detracting from the brightness of the fluoroscopic image. Experiments were conducted with a number of machines to find out the lowest output that would produce a

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*Published originally Vol. 6, No. 2, Occupational Health Review, Dept. of National Health and Welfare.

†Since 1950, further recommendations published by the Commission make clear that the maximum permissable exposures refer only to occupationally exposed individuals. This renders obsolete the maximum permissible exposures of 78 roentgens in a year to the feet of customers buying shoes. The present feeling is that a much lower figure than this is advisable.

In the 1954 Recommendations of the International Commission on Radiological Protection, the following reference to shoe fitting fluoroscopy appears: "The exposure of human beings to X-rays associated with shoe fitting machines involves inherent risks and should be limited to strictly medical procedures under the supervision of qualified persons."

satisfactory image. This study showed that a beam intensity of 12 roentgens per minute, as measured at the position of the feet, was sufficient to produce a satisfactory image in all but extremely thick soled shoes. The maximum permissible beam intensity has been based on this value. For women and children a lower beam intensity is quite satisfactory, and is therefore desirable.

Control of the Hazard to the Customer

(1) Beam Intensity.

We have seen that the beam intensity should not exceed 12 roentgens per minute for men's feet, and should be less for women and children. The figures for the latter are 10 roentgens per minute and 8 roentgens per minute respectively. A control means should be provided on the machine to make fittings at each of these three intensities.

(2) Timer.

Most competent shoe salesmen believe that five seconds is ample time in which to note the fit of a shoe. Machines should therefore be fitted with a timer which will limit the viewing time to five seconds.

(3) Number of Viewings.

Three viewings should be adequate to select a pair of shoes, and four pairs of shoes is a generous yearly average. On this basis it is possible to recommend that the number of viewings be limited to three in one day, or twelve in a year. A person who was subjected to twelve viewings, each for five seconds, at twelve roentgens per minute would therefore receive a total of twelve roentgens. As we have seen, this is within the yearly maximum limit of seventy-eight roentgens.

(4) Filter.

With any X-ray beam there is a certain proportion of rays of low energy. These do not play any useful part in forming the fluoroscopic image, but they do add to the radiation dose received by the feet. An aluminum filter, 1mm. thick, should be placed between the feet and the X-ray tube to cut out these low energy rays. These filters are commonly placed on the floor of the foot opening. Care should be taken to ensure that the aluminum is not part of the wearing surface of the floor, as this metal quickly gets worn thin by the shoes. It should therefore be protected with a piece of material such as linoleum or rubber, but should be installed so that its thickness can be easily determined.

(5) Viewing Screen.

In order to produce a satisfactory image under the conditions which have already been discussed, it is essential to have a good fluoroscopic screen. Old screens do not produce a bright image, and to compensate for this, many operators increase the output of the machine to unnecessarily high levels. To avoid having to do this, the screen quality should be equivalent to a Patterson No. B-2. It should be covered with leaded glass having a lead equivalent of at least 1.5 mm. lead for 65 kvp.

(6) Safety Switch.

Only authorized sales persons should operate the machines. To make it difficult for others to do so, the starting mechanism should be fairly complex.

(7) Warning Sign.

In order to educate customers and sales personnel about the hazards of these devices, it is advisable to post a warning sign in a conspicuous place. A suggested wording for such a sign is:

WARNING

Excessive exposure to X-ray is harmful. Shoe fittings should be limited to 3 per day, and not more than 12 per year. Shoes must be worn on both feet during a fitting.

Customers must not operate this machine.

It should be the duty of the salesman to draw each customer's attention to this sign.

(8) Miscellaneous.

Customers should always wear shoes on both feet while undergoing fluoroscopy. The shoe itself reduces considerably the amount of radiation received by the foot.

The salesman should question the customer about the number of fluoroscopic fittings received during the past year. If it is evident that the recommended number has been exceeded, the salesman should advise against using the fluoroscope until a later date.

B. The Hazard to the Sales Staff.

We will now consider the problem of the hazard to the employees of the shoe store. Here we are concerned with repeated chronic exposure to small amounts of radiation.

The Nature of the Hazard:

This will be discussed under three headings:

1. Primary or "direct" radiation.
2. Secondary or "scattered" radiation.
3. Electrical hazards.

(1) Direct Radiation.

This should not be much of a problem in the case of employees. It arises when an employee views the bones of his own feet or arms, either for demonstration or testing purposes, or to satisfy his curiosity. Direct radiation may present a hazard in some of the older shoe fitting machines, in which the X-ray tubes were not always properly shielded.

(2) Scattered Radiation.

Scattered radiation is a much more important source of hazard to the employee than is direct radiation from the primary beam. Scattered radiation is caused when the direct beam strikes an object and is reflected from it. In the case of shoe fitting machines, the primary beam is scattered from parts of the machine itself, and also from the customer's feet. The scattered rays will escape from any unshielded openings, such as the aperture for the feet, the viewing ports, and any other unintentional apertures such as cracks, holes, etc.

(3) Electrical Hazard.

These machines operate at around 50,000 volts, and present a very considerable electrical hazard. At this voltage a spark can jump 2 to 3 centimetres. The problem consists of two parts: (a) Internal grounding and (b) Installation grounding.

Control of the Hazard to the Employee

1. Primary Radiation.

(a) The operator should never use his own feet or hands for demonstration purposes; neither should he or anyone else hold a child's feet in position while the machine is in operation.

(b) The fluoroscopic screen should be covered with leaded glass having a lead equivalent of at least 1.5 mm. of lead.

2. Scattered Radiation.

(a) The machine must be constructed in such a way that radiation is reduced to 12.5 milliroentgens per hour at all positions within 6 inches of the cabinet, and at the viewing ports at eye level. An exception is made in the case of the foot opening.

(b) Foot Opening. It is practically impossible to shield the foot opening to conform to the above standard. Using leaded rubber curtains around the opening it is readily possible to reduce scattered radiation to 12.5 milliroentgens per hour at a distance of 10 feet from the foot opening. This means that the machine must be located so that the foot opening is not directed toward areas normally occupied by sales staff. At any rate, no employee should work regularly within 10 feet of the foot opening.

3. Electrical Hazard.

The machines must be grounded in accordance with electrical codes. Special attention should be paid to internal grounding and installation grounding.

An interlocking switch should be provided on any door or panel giving access to high voltage components. The switch breaks the electrical circuit whenever the container is opened. It guards against electrical shock and also against radiation which might be received while the X-ray tube is directly exposed.

The recommendations made in this paper are taken chiefly from "A Guide for Uniform Industrial Hygiene Codes or Regulations for the Use of Fluoroscopic Shoe Fitting Devices," issued by the American Conference of Governmental Industrial Hygienists in 1951. The majority of the State and City Codes in the United States are based on this Guide, though some of them have made alterations and additions.

Most of these bodies have introduced the regulations under previously existing legislation such as Public Health Acts, Sanitary Codes, etc., though a few have had special legislation passed. Following the introduction of regulations in various states and cities, the manufacturers of shoe fitting machines have made very considerable improvements in their recent models. Most of the machines made since the introduction of regulations incorporate the main features of the regulations. The manufacturers have co-operated in schemes to renovate the older machines to make them conform to the standards.

Closely associated with regulation is the need for inspection. This has mostly been done by sanitary inspectors who have had some additional training in this type of work. The necessary instruments and techniques are described by C. Garrett in Occupational Health Review, December 1951. The total cost of these instruments is about $700 to $1000.

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OSTEOID OSTEOMA OF THE ISCHIUM WITH HIP JOINT COMPLICATIONS*

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Introduction

Osteoid osteoma has been defined as a small tumour-like nidus occurring at random within bones. It is composed of osteoid and trabeculae of a newly formed bone deposited within a substratum of highly vascularized osteogenic connective tissue.

This entity has been observed not infrequently in all the long bones. Several instances have been reported in the smaller bones of the spine, the hand and the foot, particularly the latter. Its occurrence in the pelvic bones has been recorded but rarely. It has not been observed in the skull to my knowledge.

This communication records a case of osteoid osteoma occurring within the right ischium with complications involving the adjacent hip joint.

Case Report

At the time of admission to St. Joseph's Hospital, Victoria, on December 29, 1953, L.S., a white female was 10½ years old.

Her entrance complaint was pain in the area of the right hip of six months duration.

The onset of the present illness, according to the patient and her mother, is related to a fall from a fence in June 1953, following which she had to be carried into the house. She did not experience any immediate severe pain. Shortly after this incident she noted that walking caused discomfort in the region of her right hip. This gradually became worse during the ensuing six months. Often, about three or four o'clock in the morning, she would awaken crying out with pain. The family physician was consulted in December 1953 and admission to hospital advised for investigation.

Physical examination revealed a rather under-nourished, but well developed female child. There was wasting of the muscles about the right hip. External rotation and flexion were found to be limited at this joint. No particular tenderness could be elicited on palpation.

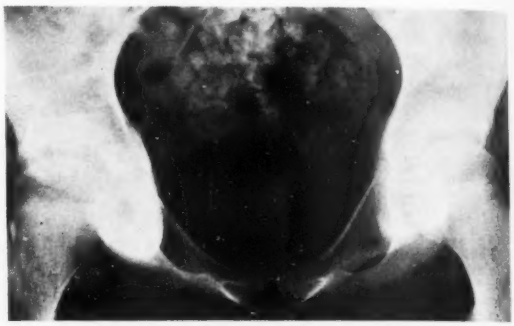

Fig. 1 — January 30th, 1953. Translucent nidus in right ischium surrounded by sclerosis. Osteoporosis of upper end of right femur.

X-ray examination of the pelvis showed a slight increase in the density of the right ischium with a suggestion of a poorly defined central translucent zone about 1 cm. in diameter within it. The upper end of the right femur was slightly decalcified.

Laboratory tests included blood and urine examinations, Mantoux 1: 1000 and Brucella agglutination tests which were all normal or negative. The erythrocyte sedimentation rate was slightly elevated, being 23 mm. per hour. Smear and culture of synovial fluid from the right hip joint revealed no organisms.

Treatment began with simple measures. Exhibition of aspirin alone was ineffectual but combined with codeine resulted in relief of her pain. Because her graphic chart from the time of admission showed a slight elevation of temperature late in the day, antibiotics and chemotherapy were instituted. This did not alter her temperature or relieve her pain. Temperature readings at various times during the next two years showed an evening elevation to be consistent and is considered normal for this patient. After this followed a period of leg traction and finally she was placed in a full hip spica which, although it did not completely relieve the pain, made her reasonably comfortable. After a stay of almost three months in hospital she was discharged to her home in the spica.

She was re-admitted for ten days in June 1954. X-ray films after removal of the spica showed little change in the appearance of the right ischium. There was, however, further decalcification of the upper end of the right

*Presented at Annual Meeting, The Canadian Association of Radiologists, January 16-18, 1956, Vancouver.

femur. She still complained of pain in the right hip. The spica was re-applied and she was discharged to continue on a conservative regimen at home.

Her third admission was on October 14, 1954, approximately sixteen months after the onset of the pain in the right hip and after ten months of conservative treatment. She still complained of pain in the right hip. Physical examination revealed muscular atrophy of the right lower extremity and marked limitation of movement at the right hip, knee and ankle. X-ray examination now showed more pronounced sclerosis of the right ischium. The central translucent nidus contained three or four small calcified foci. The hip joint space had become quite narrow and there was osteoporosis and retardation of growth of the upper end of the femur. Tomographic study confirmed these features.

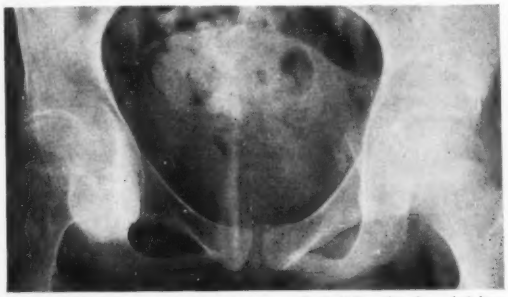

Fig. 2 — October 15th, 1954. Calcific foci within nidus. Marked osteoporosis of right femur. Narrowing of right hip joint space.

Re-assessment at this time led to the conclusion that conservative treatment was being followed to no avail and that with complications developing in the right hip surgery might be necessary. The prospect of having to excise a good part of the diseased ischium loomed up as a rather formidable obstacle, but nevertheless this seemed to be the only course offering any hope of relief now that conservative therapy had failed. This was undertaken on November 8, 1954. The posterior inferior lip of the right acetabulum was approached from behind. The surface of the ischium below the acetabulum was found to be raised and roughened. This was removed. Because the restricted space and depth of the working area precluded removal of the ischial nidus en bloc, practically all the cancellous bone of the ischial tuberosity was gouged out, leaving only the medial wall of the ischium intact. During curettement the ischial portion of the acetabular floor was pierced and a small bony fragment including a bit of articular surface was lifted out of the operative site. The cartilage was grossly described as being thinner than one would expect and of a soft brown texture and colour. The range of hip movement had been tested before operation, following induction of anaesthesia, and was found to be quite normal indicating that her pre-operative limitation was mainly due to spasm. Before the operative wound was closed a film was made while the patient was still on the operating table to be sure that the nidus had been completely removed.

Because the lesion had to be curetted out piece-meal it was impossible to reconstruct it grossly as seen on the X-ray examination. Following microscopic study of many stained sections, a pathological diagnosis of osteoid osteoma was made. This was based on finding "irregularly disposed trabeculae of osteoid and calcified bone, lying in a richly vascular skeletal mesenchyme. Surrounding the trabeculae may be seen large numbers of osteoblasts and osteoclasts as well as fibroblasts and foreign body giant cells. There is an absence of any cartilage formation." The acetabular articular cartilage which had fallen into the surgeon's hands at operation was also examined microscopically and presented a picture of degeneration.

Following operation the pain which the patient had previously complained of disappeared dramatically. Because of the degenerative changes involving the right hip, weight-bearing was prohibited and physiotherapy including hydrotherapy was begun. She was discharged the day before Christmas 1954 on crutches. During January, February and March 1955, physiotherapy was continued but the stiffness in her right hip remained unabated; furthermore she was noted to be developing an adduction deformity of this hip.

From April to August 1955, she was in and out of the hospital several times during which she was subjected to manipulation of the right hip under anaesthesia and local injection of cortisone five times. Finally tenotomy of the adductor longus tendon was performed. In spite of these procedures the adduction deformity increased.

The patient's final admission to hospital was in September 1955. She presented the paradox of having been relieved of the primary symptoms attributable to an osteoid osteoma following its removal but was now becoming crippled by a degenerative arthritis with adduction deformity of the right hip. The latter complications were apparently progressing in the face of conservative treatment. X-ray examination at this time revealed that the sclerosis in the medial portion of the right ischial wall, which had not been removed at the initial operation had now resolved. The femoral articular surface had now become somewhat irregular and cyst-like degenerative

Fig. 3 — September 1955. 11 months' post-operative. Ischial sclerosis has resolved. Degenerative changes now involve right femoral head and acetabulum. Femur adducted.

changes were noted deep to it. The capital epiphyseal line was becoming obliterated. It was thereupon decided that once again radical treatment was indicated.

On September 23, 1955, the right hip was opened using a Kocher-Gibson approach and dislocated. The femoral head was observed to be grossly irregular, the cartilage being thinned out or thickened at random over its surface. Similar changes were noted involving the acetabular articular cartilage. Through the gap made in the ischial portion of the acetabulum at the first operation, firm fibrous tissue had grown in forming an adhesion band between the ischium and lower border of the femoral neck. This was considered to be the cause of the adduction deformity. The cartilage irregularities of the femoral head and acetabulum were smoothed off and a vitallium cup was interposed between their surfaces.

At the present date, April 1956, there is shortening of the right lower limb and some limitation of movement at the right hip. Periodically she complains of pain in the hip region but is able to get about quite readily.

Discussion

The etiology of osteoid osteoma is not known. In many lesions of bones the onset of symptoms is sometimes related by the patient to trauma. This patient mentioned a fall from a fence. The lesion was observed to progress very slowly during the first six months under conservative treatment. It is not likely that it could have progressed any faster during the six months prior to seeking medical attention. We would therefore reject trauma as being the cause in this case.

The clinical, pathological and radiological characteristics of osteoid osteoma have been fully discussed by several reviewers[1,2,3]. Many of the features of this case: the patient's age, the insidious onset, night pain, joint limitation, practically no fever, negative laboratory tests, relief by aspirin and codeine, lack of response to antibiotics and finally dramatic relief of pain following excision are all typical and will not be discussed further.

The main interest in this case centers about the rare location of the lesion and the complication involving the hip joint.

The incidence of osteoid osteoma in pelvic bones is quite low. Golding[4] notes that of 198 cases reported up to 1952, only four were in the pelvis. Of 20 new cases he added not one occurred in the pelvic bones. Lewis[5] in 1944 recorded one example in the ilium, situated below the sacroiliac joint. It was characterized, as in the present case, by marked reactive sclerosis about the nidus. Sankaran[6] in 1954 reported another case located 1 inch above the acetabulum but, unlike our case, there was very little reactive sclerosis about it. Very few references to joint complications associated with osteoid osteoma are to be found. Sherman[7] in 1947 reported two cases. She concluded that "if removal of the nidus is delayed and inflammation of the joint persists for a long time, permanent damage may supervene." She considers the joint changes to be a secondary reaction to the nearby osteoid osteoma. In one of her cases the lesion was in the subcapital portion of the femur of a sixteen year-old female with complaints for two years. The joint space was narrowed and marginal hypertrophic lipping was present. Her pain was relieved by operation but limitation of movement persisted. Proliferation of the synovial membrane and excess synovial fluid were observed at operation. Chandler and Kaell[8] in 1950 observed resorption of articular cartilage adjacent to an osteoid osteoma removed en bloc from an os calcis. Subtalar arthrodesis was performed at the same operation.

There has been some speculation concerning the course of osteoid osteoma when not treated by excision of the nidus. Opportunities for such observations have been very few. The dramatic and immediate relief provided by surgery has made this by all odds the treatment of choice. Moberg[9] in 1951 described two cases which were not proven by biopsy that went on to spontaneous cure. Sherman[10] in 1947 also reported a spontaneous cure in a case without biopsy proof. It seems unlikely that it will be possible to observe the course of a proven osteoid osteoma not treated by surgery because if the lesion can be biopsied it can likely be removed. Follow-up of an incompletely excised lesion, however, would provide such an opportunity. The present case is somewhat of a compromise in this respect because surgical treatment was deferred for ten months after medical attention was sought and actually sixteen months from the onset of symptoms. Had she not developed a degenerative arthritis in the adjacent hip, conservative treatment might conceivably have been continued. During this ten-month period

of conservative immobilization three calcific foci developed within the translucent nidus. This is consistent with the process of maturation described by Lichtenstein[11]. Also as expected, the reactive sclerosis in the spongy bones surrounding the lesion increased in extent. It might be noted here that the extent of sclerosis seen in association with these lesions varies greatly from case to case. As a general rule, it is usually more marked where the nidus originates in cortical rather than spongy bone.

The unexpected feature however was the narrowing of the joint space which occurred in spite of immobilization.

No one has yet determined what actual mechanism or factor underlies the development of the reactive sclerosis about some osteoid osteomas. On the basis of the observations in this case, one might wonder whether or not the same cause was responsible for the changes in the articular cartilage of the acetabulum which were described by a pathologist as degenerative.

Following removal of the nidus the patient's pain was immediately and dramatically relieved. The remaining reactive sclerosis which had surrounded the nidus underwent resolution confirming the general impression that this is a reversible phenomenon and that it need not be extensively excavated. The reaction suffered by the articular cartilage however did not prove to be reversible. In fact, the degenerative changes progressed during the year following excision of the nidus as witnessed, first by the development of subchondral cyst-like changes, irregularity of the controur of the femoral head and premature closure of the capital epiphyseal line. Secondly by the in vivo observation of the actual articular cartilage degeneration at the subsequent operation upon the hip. The recent evidence which has been put forward by Lloyd-Roberts[12] suggesting that cartilage degeneration underlies the subsequent osseous changes in degenerative arthritis might constitute the link between cause and effect in this case. There seems to be no apparent alternative therefore but to consider this degenerative arthritis the irreversible sequela of the reaction to a nearby osteoid osteoma. There is no evidence upon which to entertain such other diagnoses as aseptic necrosis, tuberculous, rheumatoid, suppurative or traumatic arthritis. This conclusion is in accord with Sherman's[7] views published in 1947.

This discussion cannot be closed without at least a brief reference to the controversy as to whether osteoid osteoma is truly a neoplasm or an inflammatory lesion[1, 4]. We do not consider that the course of events in this case adds to the weight of evidence either way. We personally accept Jaffe's[1] belief that it is a benign neoplasm.

Conclusion

Evidence is presented suggesting that there is a grave potential danger of irreversible damage to the articular surfaces of joints adjacent to an osteoid osteoma. In particular does this apply to the hip which is notoriously susceptible to unfavourable influences. This adds urgency in such cases to the established principle of prompt surgical removal of the nidus as the treatment of choice.

Summary

A case of osteoid osteoma of the right ischium complicated by degenerative osteoarthritis of the contiguous hip joint acquired during a period of conservative treatment has been described. The patient's symptoms were finally relieved by excision of the tumour nidus, but the joint changes proved to be irreversible resulting in a permanent residual disability at the hip.

Acknowledgments

We should like to acknowledge our indebtedness for permission to report this case, as well as assistance in its preparation from Dr. Leonard Bapty whose patient this is, to Dr. R.C. Anderson who carried out the surgical treatment, and to Dr. D.B. Roxburgh, Pathologist and Mr. Leslie Spencer, Clinical Photographer, all of whom are on the Staff of St. Joseph's Hospital, Victoria.

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COMMENTS ON MEDICO-LEGAL TRENDS

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Doctors nowadays are at once the originators and beneficiaries and the victims of two contradictory and incongruous trends. They are making and using new discoveries with benefits far exceeding the wildest hopes of as short a time ago as twenty-five years. It is within the memory of many that, practically speaking, there were no specific remedies; quinine for malaria, mercury for syphilis and iron for anaemia were about the only ones. Doctors' help was limited largely to giving comfort, relieving pain and helping people adapt to disabilities the physicians could not prevent. But now? There is almost a plethora of specifics, their very number sometimes becomes an embarrassment. So complacent have we become about our powers that, if we did not plant it, we have allowed the impression to grow among people that if a doctor knows enough and is careful enough he will institute the correct procedure or give the correct substance in the proper dosage and a diagnosis or a cure will follow. So certain of this are people as a whole that when the correct diagnosis or complete cure fails to follow they cannot but think the doctor must be at fault.

And that thought perhaps explains the other trend, the tendency of people to seek legal redress if the results of treatment are not as good as they expected. We are the victims of our own prowess. We all know it is happening in our own country; a little reading convinces us it is true elsewhere, in Australia, South Africa, New Zealand; since the institution of the National Health Scheme in Great Britain it has increased disturbingly there. In an article in *Punch*, written by an anaesthetist, it is suggested that, as soon as a patient shows signs that he may not get better, to protect himself the doctor should sue him for failing to do so. In the United States, for various reasons, things are worse. There is no need to tell radiologists just how bad are those things. Your specialty probably is more affected than any other. You do not need to be reminded that premiums for malpractice insurance have reached astronomical levels, that some companies will not write some kinds of malpractice insurance in some states, that some companies insist that all a doctor's insurance be given them before they will give him a malpractice policy.

So there you have the absurd state of affairs. We can do more for people than ever before; yet more complaints and suits are being brought against us than ever before. Why? Let us see if we can find some of the reasons and suggest some remedies.

There are one or two things we would like to state clearly at the beginning. The things we are going to suggest as reasons are not hypothetical, not the product of abstract thinking. They are harsh realities learned from the letters of doctors who write the Canadian Medical Protective Association because they need assistance. Let it be said, too, that few of the causes are disgraceful things, the results of laziness and incompetence. Some few of them are, nothing can excuse them. Most of them, however, result from the inability of good men to do any better.

The first reason is a general one; the change in the physician-patient relationship. Until a few years ago doctors did more personal things for their patients, sat hours with the woman in labour, visited often the patient with pneumonia, shifted him, moved him, applied his mustard plasters. Now the woman goes to hospital where nurses and internes are with her and because of the anaesthetic she may never know her own doctor was present. The patient with pneumonia goes to hospital where someone else administers the specific and the doctor is seldom seen. The whole relationship has changed. The doctor no longer is so well known, is no longer an intimate enough friend to allow the assumption by the patient that the doctor did his best. So, when a result is not as good as expected increasing numbers of people seek redress. An illustration from your own field may strike nearer home. How many patients, dissatisfied because of an incorrect radiological diagnosis, have their dissatisfaction tempered by the knowledge that the radiologist sat long with their films, consulted with their physician about them, studied and read about the problem and took a genuine, time-consuming interest? They never saw the radiologist. They were not able to judge whether he was a scientific, conscientious doctor or some doctor who practised radiology because for him it was the easiest form of practice.

Another reason for trouble is that doctors are more hurried than used to be the case. This is true in spite of the fact that, if our better means of treatment are to be used to the full, more precise diagnosis is necessary, work that

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*Presented at Annual Meeting. The Canadian Association of Radiologists, January 11, 1955, Ottawa.

takes a longer time. Yet doctors are expected to see as many or more patients than would have been thought possible twenty-five years ago.

Still another thing is the fact that as the work in any field becomes more complex more authority has to be delegated by doctors to others. Doctors work with others such as consultants and assistants. They delegate work to residents and internes. They expect many things formerly done by themselves to be done by nurses. They train technicians to do much routine work in the field of radiology, work from which prolonged ill results may follow if standard techniques are not followed faithfully.

A reason with indirect results is that doctors, like everyone else, have become insurance-minded. Stop a moment to think of the various kinds of insurance we all carry. Think, then, of how much the insurance companies have trained us to expect from them. We simply notify them of the claim, then sit back and wait for settlement or recompense to follow. And, here is the important point. This should not happen with claims alleging professional malpractice and negligence. They deal with more valuable things than cars and houses. But doctors often seem not to recognize the difference. Very recently the Canadian Medical Protective Association received this letter from a member: "An accident happened to one of my patients during electroshock therapy in my office. Would you please send the necessary forms to be filled in such a case."

From this attitude another wrong one springs. Individual doctors seldom want to defend themselves, even against claims which have no merit. All admit the truth, even the necessity, of the principle that all defensible actions should be defended. While giving loud support to the principle that every other claim against every other doctor must be defended, the doctor says his is the exception that must be settled quietly and quickly.

Radiologists, in spite of the tools they use, in the eyes of the profession and in the eyes of the law are doctors. The different things that get them into trouble have their bases in the same types of carelessness and negligence that trip other doctors. In spite of what they seem to think, radiologists are no worse than other doctors, in the experience of the Canadian Medical Protective Association. They constitute no more lax group. They are no greater hazard. They are, in fact, a highly trained, highly competent group who, perhaps, have fewer careless members than some other groups. They are seized with the importance of their own work and do it competently. Therefore, if it be necessary, we would like to read you back into the profession. We would like to stress the applicability to you of all the rules, the customs, the professional ethics and the legal principles that apply to all doctors.

Some of these causes of trouble make their own remedies self-evident and we need not spend time on them. Doctors need not hurry so much. They need not take every case that calls. They can exercise some choice. Radiologists though they cannot see every patient could see a higher proportion of them; could see, perhaps, most of those whose problems, diagnostic or therapeutic, are major or difficult. The radiologist need not be an inaccessible god, so remote that the dissatisfied patient can be wholly impersonal in his decision to sue this mythical person who, he thinks, has wronged him.

To talk to radiologists about how and to whom they will delegate authority for the many things they personally cannot do is redundant. In any group of doctors there would be unanimous agreement that no specialty has taken the same pains to ensure adequate training in their technicians and assistants. It would be agreed that no other specialty gives the same supervision and insists so rigidly on meticulous attention to detail. But, as a remedy against some of the evils of the changing medico-legal situation, the compliment so deservedly won by the radiologists may properly be accompanied by an admonition to persist in the same carefulness.

In addition to these things that can be done by each doctor something should be done by the profession as a whole to stop it being peppered with complaints, threats, claims, writs and suits. Much more of it will mean that doctors must do all their work with one eye cocked to dodge the next bit of trouble. It is paradoxical that patients, who cause the trouble, are the greatest sufferers from it. And patients are our first interest.

We should have in mind the complement in patients of our own insurance-mindedness. There is good reason for it. People's attitude is that almost every unfortunate occurrence must be someone's fault and that someone should have to pay for the harm done. If a workman sprains his ankle at work, Workmen's Compensation pays him something. If a person gets hurt in a car accident, even if it was his own fault, an insurance company pays him something. If a person falls on a slippery spot on the street, a claim will be made against some authority. Against this background it is not difficult to understand why, when medical or surgical results are poor, people expect to claim against the doctors who had the mis-

fortune to treat them. We cannot change that attitude so we must adapt to it. Probably the best adaptation is less bragging as a group and fewer promises as individuals; much more readiness to talk about our limitations and greater care to promise to treat to the best of one's ability without any promise, actual or implied, to cure.

We should devote some time to learning how to handle a complaint or a threat when it has been made. The doctor against whom it is made should neither panic nor treat the claim lightly; neither bluff and bluster and counter-threaten nor be too humble and apologetic. The patient deserves as fair an explanation of what happened as the doctor would want if the circumstances were reversed. Above all, the explanation should be concise. More doctors talk themselves into trouble than talk themselves out. It should be factual, opinions and surmises have no place at this time. It should be kindly. A poor result for the patient may be a matter for real regret or even a tragedy.

The last piece of advice is very important. Belong to your own medical defence union. Our hesitance at giving this advice because you may consider it advertising or propaganda, is overcome by the weight of reasons for it, the sheer necessity for it, and by the feeling that once the reasons are stated they will speak for themselves. So we give it, belong to your own mutual medical defence union.

To develop and explain this advice we would like to lead you for a few moments into a general consideration of medico-legal protection. Let us dismiss from our consideration those cases which are caused by sheer negligence, carelessness or ignorance. They are few. All of us insist on having some form of protection because we know that, in spite of our best efforts, we are going to make mistakes and we want help to defend ourselves and perhaps to help pay costs if action is brought against us. Every doctor knows he may be called to legal account for an ill result that occurred because he was only human and could do no better. Every doctor at some time has berated himself after the event because he chose one rather than an alternative diagnosis or course of action and was proved wrong, even though he knows he would and should do the same thing again if the same set of facts were presented.

There are two courses of action open to a doctor and his defence organization when he is sued under those circumstances. The easiest is not to argue, to pay the smallest amount that will be accepted, get a release and try to forget the whole business. It is attractive because the doctor usually thinks that it is quiet and secret and that there will be no publicity about it. It spares the doctor the time and worry of preparing to defend himself. It obviates any court appearance. In many cases it is the cheapest way to handle the complaint.

The disadvantages are much more important and much less obvious. Actually, it is not secret at all. The patient and his friends all talk. The fact that the doctor did not defend himself makes it appear that he must have been guilty of some carelessness, so even his friends can do no less than presume his guilt. Though in any individual case it may be the cheapest way of disposing of a claim, for the profession as a whole, and often for the individual doctor, it is neither the cheapest nor the best way.

The other course of action open to the doctor and his defence organization is to fight every case that is defensible. Certainly there is publicity but it is healthy publicity. The doctor serves notice that he did his best and when he wins, demonstrates that it was a good best. Certainly, in any individual case, it may cost more. The Association has spent more than three thousand dollars to defend a case that could have been settled for a few hundred. But increasingly the profession will be badgered until it becomes general knowledge that every doctor will defend himself against claims. The Canadian Medical Protective Association has had the revealing experience of watching two opposite developments occur. It has watched a group of doctors, in this case a clinic, refuse to fight a nuisance claim against one of them, has seen a second follow as soon as the first settlement got publicity, seen a third follow the second, all within little more than a year. In contrast, in one area in Canada after one of its member successfully defended himself and forced collection of the costs of trial it learned that many doctors in that area had settled nuisance claims against themselves to the point where any bad result was almost certain to be followed by a demand for recompense. All stopped after one doctor refused to pay for something that, while unfortunate, was in no way his fault. The argument that because it is almost always cheaper to settle any one case than fight it, is specious reasoning. It costs every doctor and all doctors much more, because the money that settles or fights claims comes from just one place, our pockets. It comes from them just as directly as if a levy were made on each of us every time legal aid had to be given. There is no other source, irrespective of what organization actually signs the cheque that pays the money.

The second course of action, to defend every claim that is defensible, is better for the individual doctor and the profession.

If we accept the principle that a doctor and his defence organization will, as a matter of settled policy, handle cases to serve the best interests of the individual doctor and the profession as a whole the final step in reasoning is easy to take. The profession cannot expect any organization other than one of and responsive to itself to recognize this principle and to take the necessary action to implement it. The Canadian Medical Protective Association was conceived by, is owned and run by doctors. It is your own organization. Without any conflicting financial purpose it exists to do one thing; to provide the best protection possible for its members. Because it is not an insurance company and does not issue a contract some doctors seem to fear their appeals for help would get no response but, over its fifty-four years of existence, no doctor ever has been refused whatever help was currently available. It may interest you that the late Dr. R. K. Paterson sat on Council for many years and that his seat has been taken by Dr. T. G. Stoddart who can supply you with more detailed information than one talk could carry. There is the experience of Great Britain to draw on. Nearly all the profession there belong to the defence unions and, until new problems were introduced by the Health Insurance Scheme, doctors could practise with less medico-legal worry than on this side of the water. With considerable pride the Canadian Medical Protective Association feels that doctors in Canada owe their relative freedom from legal worry partly to its activities.

Summary:

We have tried to state some of the causes of our changing medico-legal status and the results and to suggest some remedies that will prevent our situation getting worse if they do not produce some improvement.

THE CANADIAN ASSOCIATION OF RADIOLOGISTS

The Twentieth Annual Meeting of the Canadian Association of Radiologists will be held in Montreal at the Sheraton-Mt. Royal Hotel, January 13th to 17th, 1957.

THE NINTH ANNUAL CONFERENCE ON ELECTRICAL TECHNIQUES IN MEDICINE AND BIOLOGY

The Ninth Annual Conference on Electrical Techniques in Medicine and Biology will be held at the Governor Clinton Hotel in New York City on November 7, 8, and 9, 1956.

The Conference is sponsored by the American Institute of Electrical Engineers, the Institute of Radio Engineers, and the Instrument Society of America. In addition to the technical sessions, there will be field trips to installations of interest to those attending.

Titles and brief abstracts for profferred papers may be submitted to the Conference Chairman, E. Dale Trout, General Electric Company, X-Ray Department, Milwaukee 1, Wisconsin.

POSITIONS AVAILABLE

"Position Vacant — Applications invited for full-time appointment as Assistant Radiotherapist. Candidates should be in possession of Canadian Certifications in Therapeutic Radiology or D.M.R.T. Apply to: Associate Director, Cancer Clinic, Department of Public Health, Edmonton, Alberta, giving usual particulars as to training and qualifications, age, recent photograph and copies of recent testimonials."

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